

Docket No. 99-038-TAP

CLAIMS:

What is claimed is:

1. A compact optical tracking system for magnetic tape,
comprising:

3 \ a magnetic head assembly;

4 \ a positioning actuator for changing the

5 position of the magnetic head assembly; and

6 an optical servo module structure for

7 outputting a position signal to the positioning

8 actuator, causing the positioning actuator to change

9 a position of the magnetic head assembly, wherein

10 the optical servo module structure comprises at

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11      least one optical servo module, comprising:

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12 an optical beam source for emitting an
13 optical beam;

14 a detector for detecting an optical beam
15 reflection; and

16 an optical beam interference composition;
17 for interfering with the optical beam and
18 producing a predetermined pattern on a target.)

1 2. The compact optical tracking system recited in claim
2 1, wherein each optical servo module contains at least a
3 first and second detector for detecting an optical beam
4 reflection.

1 3. The compact optical tracking system recited in claim
2 2, wherein the magnetic head assembly comprises a read

3 and a write head, and the optical servo module structure
4 is affixed to the magnetic head assembly between the read
5 and write heads, and the optical servo module structure
6 faces a front side of the magnetic tape.

1 4. The compact optical tracking system recited in claim
2 2, wherein the optical servo module structure comprises a
3 plurality of optical servo modules.

1 5. The compact optical tracking system recited in claim
2 4, wherein the optical servo module structure is affixed
3 to a side of the magnetic head assembly and oriented to
4 an angle of tape wrap of the magnetic tape.

1 6. The compact optical tracking system recited in claim
2 4, further comprising:

3 a yoke assembly, wherein the optical servo
4 module structure is affixed to a yoke assembly, and
5 the optical servo module structure faces a back side
6 of the magnetic tape.

1 7. The compact optical tracking system recited in claim
2 6, further comprising:

3 a grating assembly, wherein the grating
4 assembly comprises at least one reference grating
5 used as a target for the predetermined pattern
6 emitted from the optical source within the optical
7 servo module.

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1 8. The compact optical tracking system recited in claim
2 7, further comprising:
3 an outboard reference grating on the grating
4 assembly, wherein the outboard reference grating is
5 affixed to the grating assembly past the extent of
6 the magnetic tape; and
7 an outboard servo module, wherein the
8 predetermined pattern emitted from the optical
9 source within the outboard servo module uses the
10 outboard reference grating as a target.

1 9. The compact optical tracking system recited in claim
2 8, wherein the positioning actuator is configured between
3 the yoke assembly and the magnetic head assembly, and
4 wherein only the magnetic head assembly is moved by the
5 positioning actuator.

1 10. The compact optical tracking system recited in claim
2 8, wherein the positioning actuator is configured
3 adjacent to both the yoke assembly and the magnetic head
4 assembly, wherein the yoke assembly and the magnetic head
5 assembly are moved by the positioning actuator.

1 11. The compact optical tracking system recited in claim
2 8, wherein one of the reference grating and outboard
3 reference grating contain a reference index on the
4 reference grating.

1 12. The compact optical tracking system recited in claim
2 8, wherein the grating assembly is affixed to the
3 magnetic head assembly between the read and write heads.

1 13. The compact optical tracking system recited in claim
2 8, wherein the outboard reference grating is affixed
3 adjacent to one of the read and write heads.

1 14. The compact optical tracking system recited in claim
2 8, further comprising:

3 a fine positioning actuator for adjusting the
4 magnetic head assembly relative to one of the
5 reference grating and the outboard reference
6 grating.

1 15. The compact optical tracking system recited in claim
2 11, further comprising:

3 a fine positioning actuator for adjusting the
4 magnetic head assembly relative to the reference
5 index on one of the reference grating and the
6 outboard reference grating.

1 16. The compact optical tracking system recited in claim
2 8, further comprising:

3 a linear actuator for loading magnetic tape
4 onto the magnetic head assembly.

1 17. The compact optical tracking system recited in claim
2 8, further comprising:

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3 a rotary actuator for loading magnetic tape
4 onto the magnetic head assembly.

1 19. The compact optical tracking system recited in claim
2 4, wherein the optical beam interference composition is a
3 hologram.

1 21. A compact optical tracking system for magnetic tape,
2 comprising:

3 a magnet head assembly comprising:
4 a magnetic head and
5 an optical servo module structure for
6 outputting a position signal to the positioning
7 actuator, causing the positioning actuator to
8 change a position of the magnetic head
9 assembly, wherein the optical servo module
10 structure comprises at least one optical servo
11 module, each comprising:
12 an optical beam source for emitting
13 an optical beam;
14 a detector for detecting an optical
15 beam reflection; and

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16 an optical beam interference
17 composition for interfering with the
18 optical beam and producing a predetermined
19 pattern on a target.

1 22. The compact optical tracking system recited in claim
2 21, wherein the optical servo module structure is affixed
3 to a side of the magnetic head assembly and oriented to
4 an angle of tape wrap of the magnetic tape.

1 23. The compact optical tracking system recited in claim
2 21, wherein the magnetic head further includes a read
3 head section and a write head section and a cavity
4 between the read head section and the write head section,
5 wherein the optical servo module structure is positioned
6 in the cavity between the read head section and the write
7 head section.

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